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## Mammary Tumor Reconstruction in a Domestic Short Haired Cat

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## Case Report

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## ABSTRACT

A 9 years old female cat was presented with the history of large tumor mass in the caudal abdominal, inguinal mammary gland region which was irregular, measuring 4 cm × 4 cm, non-ulcerated, freely movable and firm in consistency. Fine Needle Aspiration Cytology of the tumor mass and inguinal lymph node revealed mammary adenocarcinoma. Bilateral caudal radical mastectomy was done to excise the tumor mass along with inguinal lymph nodes with wide margins. As there was metastatic spread of tumor mass to the rectus fascia and muscle, partial ventral abdominal wall was resected and reconstructed with polypropylene mesh. A bilateral flank fold flap was elevated, mobilised and transposed to close the ventral skin deficit. The cat recovered uneventfully without much complications.

## Keywords:

Bilateral flank fold flap, Cat,  
Mammary adenocarcinoma,  
Polypropylene mesh,  
Radical mastectomy.

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Mammary carcinoma is the 3<sup>rd</sup> most common cancer in cats, affecting mainly females with a mean age at diagnosis of 10–12 years and more than 80% are malignant (Wiste *et al.*, 2002; Giménez *et al.*, 2010). The behaviour of these tumors is characterized by local invasion into the vasculature and surrounding tissues and by metastasis to distant locations, including the draining lymph nodes, lungs, and other sites (Hayes and Mooney, 1985). Radical unilateral or bilateral mastectomy is the recommended surgical method for the treatment of feline malignant mammary tumors as it significantly reduces the chance of local recurrence (MacEwen *et al.*, 1985; Novasad, 2003).

The cat was premedicated with Butorphanol @ 0.2 mg/kg IM (Butodol, Neon laboratories, Mumbai, India) and Midazolam @ 0.2 mg/kg IM (Midoryx, Taj pharma pvt ltd, India). General anaesthesia was induced with Propofol @ 4 mg/kg IV (Neorof, neon laboratories, Mumbai) and maintained with 2% Isoflurane (Forane, Abbott Laboratories, India) in 100% oxygen. The surgical site was prepared aseptically. Sterile surgical skin marker was used to delineate the tumor mass to be ex-

cised leaving 2 cm all around the mass with wide margins (Fig. 1). An elliptical skin incision was made around the base of the tumor mass over the pre-drawn margin. Careful blunt dissection was made to free the tumor from the surrounding tissue, abdominal muscles and fascia. Enbloc excision of tumor mass was done along with sentinel lymphnodes. As there was spread of tumor mass in the rectus fascia and the abdominal musculature, a portion of muscle along with rectus fascia was resected enbloc (Fig. 2 and Fig. 3). The ventral abdominal defect was reconstructed using polypropylene mesh (Fig. 4). The outline of the flank fold bilaterally was marked with sterile surgical skin marker. Symmetrical medial and lateral incisions were made (Fig. 5) and the flap was undermined in a stepwise fashion, elevated from the quadriceps, transposed and sutured into the defect (Fig. 6). Corrugated drain sheet was placed and it exited through the dependent part of the body for drainage of tissue fluids and to prevent seroma formation. The subcutaneous tissues were closed in continuous suture pattern with Polyglycaprone size 3-0. The skin was sutured with monofilament Polyamide suture size 3-0 in mattress pattern. Immediately following surgery Butorphanol @ 0.2 mg/kg (NEON laboratories, Mumbai) was administered intramuscularly. Later on post-operatively cefotaxime @ 20 mg/kg P/O BID (Taxim, Alkem pharma, India), meloxicam @ 0.2 mg/kg

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P/O SID (Melox Vet, Morvel Laboratories, Meshana, India) and tramadol @ 4 mg/kg P/O TID (Supridol, Neon laboratories, Mumbai, India) was administered for 5 days. The excised tumor sample and lymphnode was collected in 10% formalin and sent for histopathological examination.

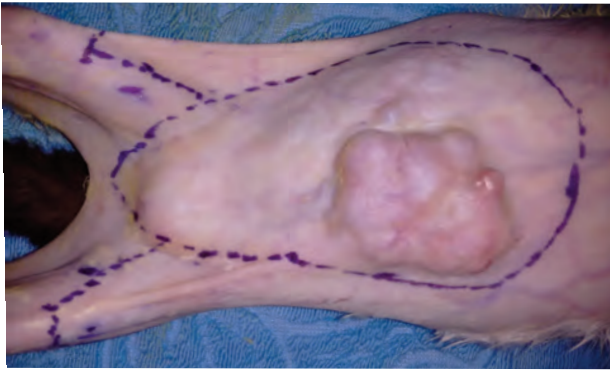


Fig. 1. Skin marking leaving 2 cm from the tumor mass and flank fold flap

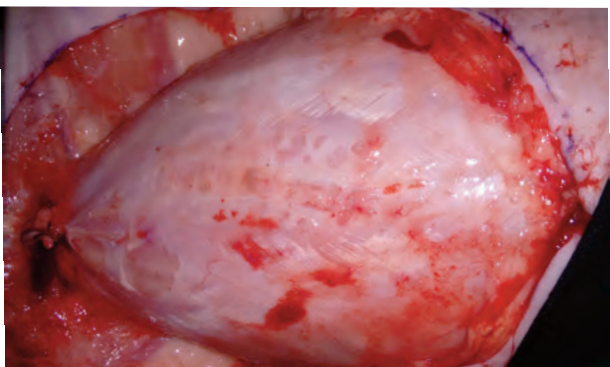


Fig. 2. Metastatic spread of tumor mass in the rectus abdominis muscle.

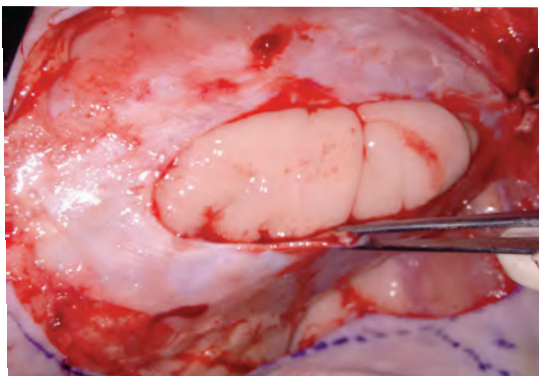


Fig. 3. Radical excision of rectus abdominis muscle adjacent to linea alba

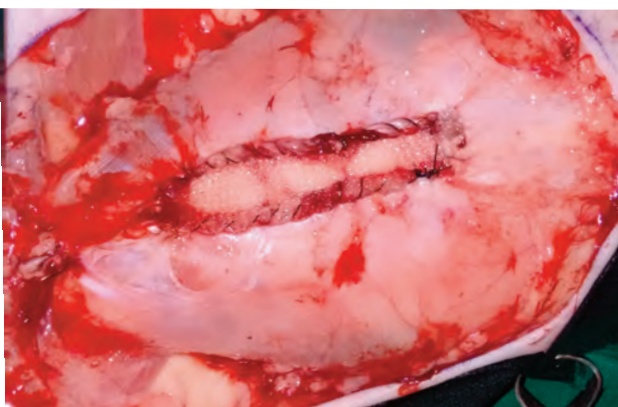


Fig. 4. Reconstruction of ventral abdominal wall using polypropylene mesh.

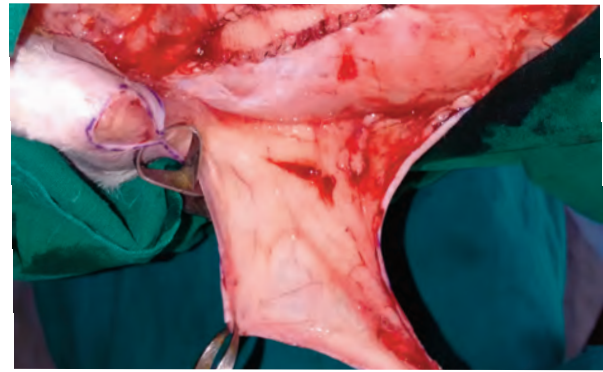


Fig. 5. Bilateral elevation of flank fold flap.



Fig. 6. Suturing of bilateral flank fold onto the skin defect with drain tube placement.

Histopathological examination of the tumor mass revealed tubular adenocarcinoma with the tubular arrangement of the neoplastic glandular epithelial cells. The lining of the tubules was one to two cells thick with distinct outline, abundant eosinophilic cytoplasm, multiple nucleoli and mitotic figures (Fig. 7). Metastasis of primary tumor tissue was noticed in the inguinal lymph nodes and in the rectus muscle (Fig. 8 and Fig. 9). The characteristic pattern of tubular adenocarcinoma was observed in the lymph node and rectus muscle also.

The mobile skin of dogs and cats favours transposition of large pedicle or free grafts. When multiple tumors are located in both chains mammary glands either staged unilateral mastectomies, in four to six weeks' period, or a simultaneous bilateral mastectomy may be performed at one stage in selected flat chested animals with loose and pendulous mammary skin (Bartels *et al.*, 1978). In case of large mastectomy wounds created mainly after bilateral excisions or following large tumor

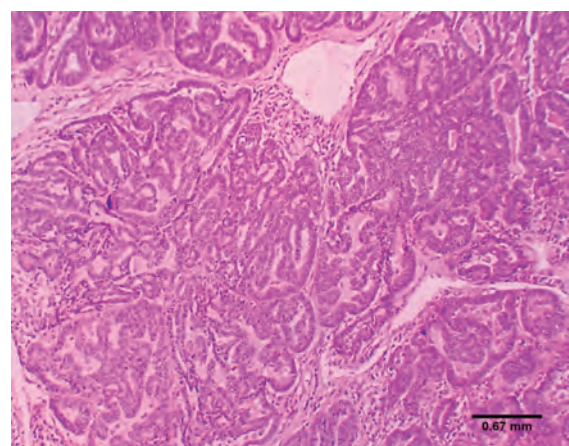


Fig. 7. Mammary adenocarcinoma. Tubular pattern with neoplastic glandular epithelial cells. (Haematoxylin and Eosin, 100 X, scale bar 670  $\mu$ m)



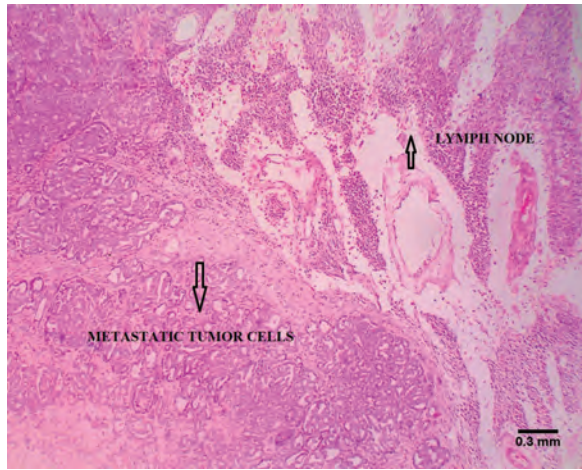


Fig. 8. Metastatic spread of tumor cells in the inguinal lymph node. (Haematoxylin and Eosin, 100 X, scale bar 300 µm)

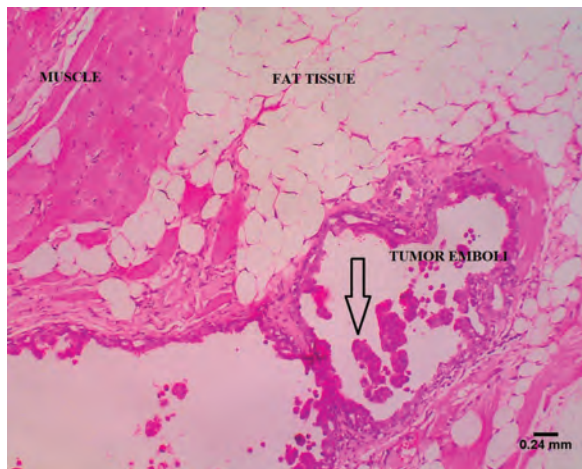


Fig. 9. Tumor emboli noticed in the muscle tissue. (Haematoxylin and Eosin, 100 X, scale bar 240 µm)

excision in the medial thigh or sternum, bilateral or unilateral skin fold flaps may be used respectively to cover the defects (Hunt, 1995). In the above case the tumor mass was excised with 2 cm wide margin and the large inguinal defect created was closed with bilateral flank fold flap. The skin tension lines and pliability are important when considering a donor site to ensure that the donor site is amenable to primary closure (Pavletic, 1999). In the above case availability of the flank fold flap was estimated before transposition. After the flap dimensions have been established, a felt-tip pen can be used to outline the flap boundaries, providing a guide for skin incision.

The flaps created should be at least 20% larger than the defect to avoid excess tension on the repair edges (Pavletic, 2003). Creation of advancement flaps from all four skin folds allows coverage of most of the ventral midline in the cat (Hunt, 1995). The elbow and flank fold flaps allow a wide range of limb motion to occur. In the above case there was difficulty in walking for initial two days after surgery and later on there was no discomfort. The types of synthetic materials used in animals for abdominal wall reconstruction include polytetrafluoroethylene, carbon polycaprolactone, polyester, polyethylene, polypropylene, nylon, and stainless steel and the most common complications include seroma, infection dehiscence and herniation (Bowman *et al.*, 1988). In the above case polypropylene mesh was chosen for ventral body wall reconstruction as it was readily available, economical, inert, high tensile strength and resistance to infection.

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